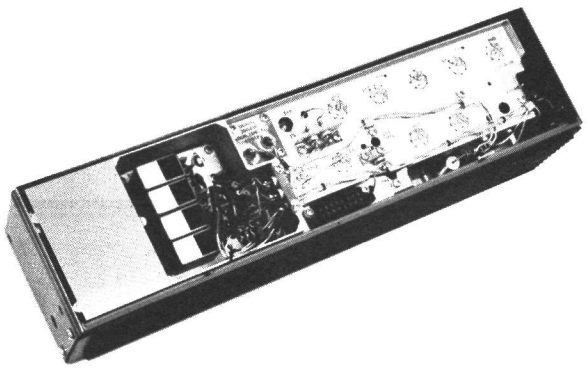
GE MOBILE RADIO

MASTR PROGRESS LINE

470-512 MHz, RECEIVER MODELS 4ER42K10-33 & 4ER42L10-33



ER-42-K&L

SPECIFICATIONS *

	ER-42-K&L	
FCC Filing Designation		
Frequency Range	470 - 512 MHz	
Audio Output	5 watts at less than 5% distortion	
Sensitivity	Standard Receiver	Ultra-High Sensitivity Receiver
12-dB SINAD (EIA Method)	0.40 μV	0.25 μV
20-dB Quieting Method	0.55 μV	0.30 μV
Intermodulation (EIA)	-75 dB	-70 dB
Selectivity		
EIA Two-Signal Method	-85 dB (adjacent channel, 25 kHz channels)	
20-dB Quieting Method	-100 dB at ±20 kHz	
Spurious Response	-100 dB	
First Oscillator Stability		
Type ER-42-K Receivers	±.0005% (-30°C to +60°C)	
Type ER-42-L Receivers	+.0002% (-30°C to +60°C)	
Modulation Acceptance	±7.5 kHz	
Squelch Sensitivity		
Critical Squelch		
Standard Receiver	0.2 μV	
UHS Receiver	0.15 μV	
Maximum Squelch	Greater than 20 dB quieting (less than 1.5 μV)	
Maximum Frequency Separation	0.4%	
Frequency Response	+1 and -8 dB of a standard 6-dB per octave de-emphasis curve from 300 to 3000 Hz (1000-Hz reference)	

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

DESCRIPTION

General Electric MASTR Progress Line Receivers Types ER-42-K & L are double-conversion, superheterodyne FM receivers designed for operation in the 470-494 and 494-512 megahertz bands. The Type ER-42-K Receivers contain a standard oscillator with a frequency stability of ±0.0005%, while the Type ER-42-L Receivers contain an Integrated Circuit Oscillator Module (ICOM) with a frequency stability of ±0.0002%. Standard and ultra-high sensitivity (UHS) versions are available for both types.

The receivers are of single-unit construction and are completely housed in an aluminum casting for maximum shielding and rigidity. The top part of the casting contains the front end through the 1st low IF amplifier stages. The bottom portion of the casting contains the audio squelch board and the optional Channel Guard encoder-decoder board.

CIRCUIT ANALYSIS

The MASTR Progress Line Receiver is completely transistorized, using silicon transistors throughout for added reliability. Input leads to the receiver are individually filtered by the 20-pin feed-through by-pass connector J443. A regulated +10 volts is used for all receiver stages except the audio PA stage which operates from the 12-volt system supply.

Centralized metering jack J442 is provided for use with General Electric Test Set Models 4EX3A10 or 4EX8K11, for ease of alignment and servicing. The Test Set meters the oscillator, multiplier, and limiter stages as well as the discriminator, and regulated 10 volts.

RF AMPLIFIER (A410/A411)

RF Amplifier A410/A411 is used only in ultra-high sensitivity (UHS) receivers and consists of two tuned helical resonators and an RF amplifier (Q1).

The RF amplifier uses a Field-Effect Transistor (FET) as the active device. A FET may be considered a semiconductor current path (or channel) whose resistance is varied by a voltage applied between the "gate" and "source" terminals. Lead identification for the FET is shown in Figure 2A. The FET has voltage-controlled characteristics, and may be compared to a vacuum tube in operation (see Figure 2B).

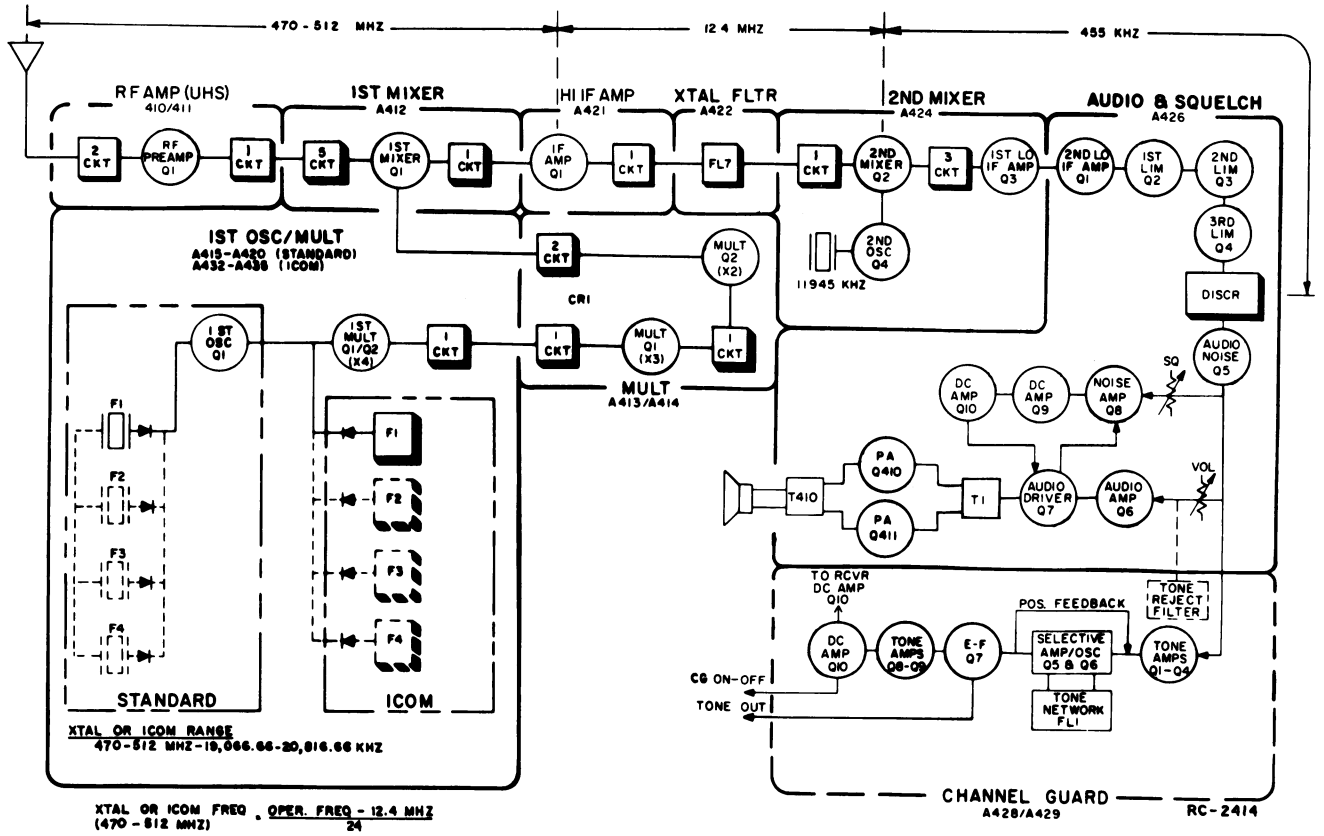


Figure 1 - Receiver Block Diagram

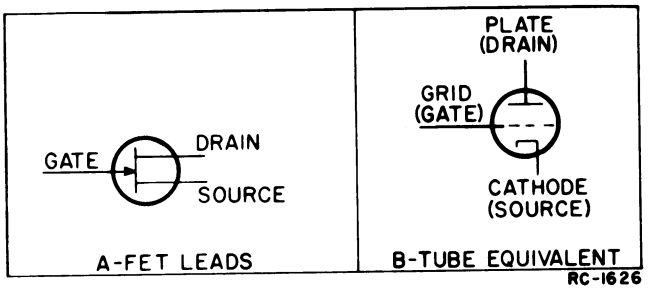


Figure 2 - FET Nomenclature

RF from the antenna is coupled through cable W444 to a tap on L410/L412. The tap is positioned to provide the proper impedance match to the antenna. RF energy is coupled to L411/L413 through an opening in the shield wall, and then to the source terminal of FET Q1.

Q1 operates as a grounded-gate amplifier. This method of operation provides a low impedance input to the amplifier. The amplified output is taken from the drain terminal and coupled through a tuned circuit (C7 and L2/L3) to the input of five helical resonators.

HELICAL RESONATORS

In receivers without the UHS option, the front end RF selectivity is provided by five tuned helical resonators (L414/L419 through L418/L423). RF cable W441 connects the RF signal from the antenna to a tap on L414/L419. The tap is positioned to provide the proper impedance match to the antenna. The output of L418/L423 is coupled through capacitor C1 to the 1st mixer assembly.

1ST OSCILLATOR AND MULTIPLIER

Receiver Models 4ER42K10-33 are equipped with standard Oscillator/Multiplier Boards A415-A420. Receiver Models 4ER42L10-33 are equipped with Oscillator/Multiplier Boards which use the Integrated Circuit Oscillator Module (ICOM).

Standard Oscillator/Multiplier Board (A415-A420)

The oscillator in the standard Oscillator/Multiplier Board is a transistorized Colpitts oscillator. The oscillator crystal operates in a fundamental mode at a frequency of approximately 16 to 29 megahertz. The crystal is cut to provide temperature compensation at the high end of the termperature range and is thermistor compensated at low temperatures. This provides instant warm-up with a frequency stability of ±0.0005% without crystal ovens or warmers.

In single-frequency receivers, a jumper from H1 to H2 connects regulated +10 volts to the crystal circuit. Feedback for the oscillator is developed across C34.

In multi-frequency receivers, a diode is connected in series with the crystal and up to three additional crystal circuits can be added. The 10-volt jumper is removed, and the proper frequency is selected by switching the desired crystal circuit to +10 volts by means of a frequency selector switch on the control unit. Switching the +10 volts to the crystal circuit forward biases the diode in series with the desired cyrstal, and the crystal frequency is applied to the base of oscillator transistor Q1. The oscillator output is coupled through C32 to the base of 1st Multiplier Q2.

The 1st multiplier output is coupled through T1/T2 to Multiplier Board A413/A414. T1/T2 is tuned to four times the crystal frequency. The 1st multiplier stage is metered at J442-4 through metering network C38, CR6, R17 and R18.

Oscillator/Multiplier Board with ICOM (A432-A435)

Oscillator/Multiplier Boards A432-A435 uses ICOM Module Model 4EG26A10. The ICOM module consists of a crystal-controlled Colpitts oscillator, a voltage regulator, and a buffer output stage. The entire module (including crystal) is enclosed in a dust-proof aluminum can, with the ICOM frequency and the receiver operating frequency printed on the top. Access to the oscillator trimmer is obtained by prying off the plastic GE decal on the top of the can.

The oscillator frequency is temperature-compensated at both ends of the temperature range to provide instant frequency compensation, with a frequency stability of ±0.0002% without crystal ovens or warmers.

In single-frequency receivers, +10 volts for operating the ICOM is obtained by a jumper from H1 to H2. With the ICOM operating, diode CR1 is forward biased and the oscillator output is applied to the 1st multiplier Q1.

The 1st multiplier output is coupled through T1/T2 to multiplier board A413/A414. T1/T2 is tuned to four times the ICOM frequency. The 1st multiplier stage is metered at J442-4 through metering network C4, CR5, R5 and R6.

In multi-frequency receivers, up to three additional ICOM modules can be plugged into the board. The 10-volt jumper is removed and the proper frequency is selected by switching the desired ICOM to +10 volts by means of a frequency selector switch on the control unit.

CAUTION

All ICOM modules are individually compensated at the factory, and cannot be repaired in the field. Any attempt to remove the ICOM cover will void the warranty.

MULTIPLIER BOARD (A413/A414)

Following the oscillator board are two multiplier stages. A413-Q1 operates as a tripler, and Q2 operates as a doubler. Q2 is metered at J442-1 across metering resistor R6.

The output of Q2 is coupled through two helical resonator circuits to the source terminal of the 1st mixer. The helical resonators are tuned to six times the 1st multiplier output for a total multiplication of 24 times the crystal frequency.

1ST MIXER (A412)

The 1st Mixer uses a Field-Effect Transistor (FET) as the active device (Fig. 2). The FET mixer has several advantages over a conventional transistor mixer, including a high input impedance and an output that is relatively free of harmonics (low in intermodulation products).

RF from the hilical resonators is applied to the gate of Q1, and injection voltage from the multiplier is applied to the source. The mixer output is taken from the drain with the output tuned to the 12.4 MHz high IF frequency.

HI IF AMPLIFIER (A421) AND CRYSTAL FILTER (A422)

A series-resonant circuit (A412-L2 and -C3) couples the mixer output to the emitter of the high IF amplifier A421. The transistor is connected as a grounded-base amplifier which provides a low impedance for the mixer input. The amplifier output is coupled through transformer T1 to the crystal filter.

Highly-selective crystal filter A422 provides the major selectivity for the receiver. The output of the filter is coupled through impedance-matching transformer A424-T2 to the base of the 2nd mixer.

2ND OSCILLATOR, 2ND MIXER AND 1ST LO IF AMPLIFIER (A424)

A424-Q4 operates in a Colpitts oscillator circuit, with feedback supplied through C18. The oscillator low-side injection voltage (11,945 kHz) is applied to the base of the 2nd mixer.

The High IF signal from the filter and the injection voltage from the 2nd oscillator is applied to the base of 2nd mixer Q2. The 445-kHz mixer output is applied to three tuned low IF circuits, L, L2 and L3. These tuned circuits are required for shaping the nose of the IF waveform, and for rejecting any undesired output frequencies from the 2nd mixer.

The low IF signal is applied to the base of 1st low IF amplifier Q3. The output of Q3 is R-C coupled to the base of the 2nd low IF amplifier.

2ND LO IF AMPLIFIER AND LIMITERS (A426)

Additional amplification of the low IF signal going to the limiter stages is provided by 2nd low IF amplifier A426-Q1. This stage is metered at J442-2 through a metering network consisting of C19, CR3 and R25.

Following the 2nd low IF amplifier are three R-C coupled limiter stages (a426-Q2, -Q3 and -Q4). The 1st limiter is metered at J442-3 through metering network C20, CR4 and R26.

DISCRIMINATOR (A426)

The limiter output is applied to a Foster-Seely type discriminator, where diodes CR1 and CR2 rectify the 455-kHz signal to recover the audio. The discriminator is metered at J442-10 through metering network C16 and R23.

AUDIO - NOISE AMPLIFIER (A426)

The discriminator output is coupled through a low-pass filter (C16, C18, R21 and R22) to the base of audio-noise amplifier Q5. The filter removes any 455-kHz signal remaining in the discriminator output. Q5 operates as a emitter-follower to match the discriminator impedance to the VOLUME control, SQUELCH control, and Channel Guard input. The stage also provides power gain.

AUDIO AMPLIFIERS (A426)

Any audio present in the incoming signal is coupled from the emitter of Q5 through the VOLUME control and a de-emphasis network to the base of audio amplifier Q6. The de-ehphasis network consists of C22, C23, R30 and R31.

Audio driver Q7 follows the audio amplifier. The audio output of Q7 is coupled through transformer T1 to provide phase inversion for the push-pull audio PA stage.

Q410 and Q411 operate as a push-pull Class AB audio PA stage. The PA output is coupled through audio transformer T410 to the loudspeaker. The yellow and white tertiary windings of T410 supply balanced feedback to the collector of Q7. The feedback winding minimizes distortion and prevents the pick-up of external electrical noise.

Base bias for the PA stage and the elimination of crossover distortion is controlled by bias adjust potentiometer R43. The potentiometer is set at the factory as shown in STEP 1 of the receiver Test Procedure.

NOTE

Do not adjust bias adjust potentiometer R43 unless PA transistors Q410 and Q411 have been replaced.

Audio high and low are also present at centralized metering jack J442, and can be used as shown in STEP 1 of the receiver Test Procedure. The output stage provides 5 watts at less than 5% distortion into a 3.5-ohm load at the receiver output terminals (3.2-ohms load at the Control Unit).

SQUELCH (A426)

Noise from the audio-noise amplifier operates the squelch circuit. With no carrier present in the receiver, this noise is coupled to the base of noise amplifier Q8 through a high-pass filter which attenuates frequencies below 3 kHz. The filter consists of C30, C31 and R45, as well as C34 and L3 in the collector circuit of Q8. The gain of Q8 is determined by the Squelch control, which varies the bias on the base of Q8. Thermistor RT2 keeps the critical squelch constant over wide variations in temperature.

The output of noise amplifier Q8 is rectified by diodes CR5 and CR6, and filtered by C36 and C37 to produce a negative DC voltage. This DC voltage is applied to the base of DC amplifier Q9, turning it off. When turned off, the collector voltage of Q9 rises to approximately 8 volts, turning on DC amplifier Q10. When conducting, the collector voltage of Q10 drops to almost ground potential, which removes the base bias to audio amplifier Q6 and audio driver Q7, turning them off.

When the receiver is quieted by a signal (unsquelched), the noise in the receiver is reduced, turning DC amplifier Q9 on and DC amplifier Q10 off. This allows the audio stages to conduct so that sound is heard in the speaker.

Resistor R53 connects from the emitter of audio driver Q7 to the emitter of noise amplifier Q8, providing a hysteresis loop in the squelch circuit. When a weak signal opens the squelch circuit. When a weak signal opens the squelch, the signal level may be reduced by 4 to 6 dB without the squelch closing. This limits squelch "flutter" or "picket-fence"operation.

With audio driver Q7 conducting, a positive voltage through R53 helps to reduce the gain of noise amplifier Q8. This positive feedback provides a quick, positive switching action in the squelch circuit. When the receiver squelches, audio driver Q7 turns off and its emitter potential drops to zero. This reduces the DC feedback through R53 to the emitter of noise amplifier Q8. Reducing the feedback causes Q8 to conduct harder, turning the audio stages off quickly.

Keying the transmitter removes the +10 volts from J19, turning off DC amplifier Q9 and turning on Q10 to mute the receiver.

CHANNEL GUARD (A428/A429)

Channel Guard Board Model 4EK16A10 is a fully transistorized encoder-decoder for use in the MASTR Professional Series mobile and station combinations. The tone frequencies are controlled by plug-in tone networks that are made with precision components for excellent stability and reliability. The tone frequencies range from 71.9 to 203.5 Hz.

Encoder (A428)

Keying the transmitter removes the receiver mute +10 volts, and forward biases feedback control diode CR5, causing it to conduct. When conducting, the diode shunts R39 which reduces the impedance of the positive feedback loop (R39, R35 and C19). This provides the necessary gain to the base of Q5 to permit oscillation.

The encoder tone is provided by selective amp-oscillator transistors Q5 and Q6 which oscillate at a frequency determined by the tone network. Negative feedback applied through the tone network to the base of Q5 prevents any gain in the stage except at the desired encode frequency.

Starting network R45, C21, C22 and CR6 provide an extremely fast starting time for the encoder tone. Keying the transmitter removes the receiver mute +10 volts, causing a pulse to be applied to the base of Q6 to quickly start the oscillator. Thermistor-resistor combination R32 and RT1 provides termperature compensation for the oscillator output. Limiter diodes CR3 and CR4 keep the tone amplitude constant.

Emitter-follower Q7 follows the oscillator circuit. The encoder tone is taken from the emitter of Q7 and applied to an active low-pass filter (G101) on the transmitter.

Decoder (A428)

The decoder function is designed to eliminate all calls that are not tone coded for the Channel Guard frequency. As long as the CHANNEL GUARD-OFF switch on the control unit is left in the CHANNEL GUARD position, all signals are locked out except those from transmitters that are continuously tone coded for positive identification by the receiver.

Placing the CHANNEL GUARD-OFF switch in the OFF position instantly disables the Channel Guard operation so that all calls on the channel can be heard. When the hookswitch option is used, lifting the microphone from its hanger disables the Channel Guard Circuit.

Audio, tone and noise are taken from the emitter of the receiver audio-noise amplifier A426-Q5 and is fed through A428-J1 to four tone amplifier and bandpass filter circuits. The filters remove the audio and high-frequency noise from the signal, and the tone amplifiers provide sufficient gain to insure clipping by limiter diodes CR1 and CR2. The clipping action eliminates variation in the squelch performance due to changes in tone deviation. The signal is then applied to selective amplifiers Q5 and Q6 which amplify only the tone determined by the tone network.

The output of the selective amplifier is applied through emitter-follower Q7 to the high gain, broad-band tone amplifiers Q8 and Q9. The output of Q9 is rectified by detector diodes CR7 and CR8, and the resulting negative DC voltage controls the squelch gate. Q8 is normally biased for low gain. Then the tone is detected by CR7 and CR8, feedback is provided through R54 to quickly change the bias on Q8 for full gain. This ensures a more positive "unsquelching" action.

Squelch gate diode CR9 is normally forward biased by a positive DC voltage (approximately 1.5 volts) fed through R58. The forward bias causes CR9 to conduct, feeding a DC voltage to the base of DC amplifier A426-Q10 in the receiver. This removes the bias on the receiver audio stages and holds them off.

When the proper tone is applied to the decoder, the negative DC voltage from the detector diodes back-biases squelch gate diode CR9 and cuts off the positive bias to the receiver DC amplifier A426-Q10. However, the receiver noise squelch circuit continues to operate until a carrier quiets the receiver.

Placing the CHANNEL GUARD - OFF switch in the OFF position (or removing the microphone from its hookswitch) removes the ground to the base of the decoder DC switch (Q10), causing it to conduct. This back-biases squelch control diode CR9 and cuts off the positive bias to the receiver DC amplifier (A426-Q10). The receiver noise squelch circuit continues to operate until a carrier quiets the receiver.

A tone rejection filter connected in parallel with A426-J2 (in the receiver bypasses any incoming tone to ground. This attenuates the tone level reaching the receiver audio circuits. The filter is composed of C26, C27, C28, C29, L1 and R59.

An optional tone reject filter (A429) that is identical to the filter dexcribed above is available for use in two-way radios with transmitter Channel Guard only.

MAINTENANCE

DISASSEMBLY

To service the receiver from the top—

1. Pull locking handle down and pull radio about one inch out of mounting frame. (see Fig. 3).
2. Pry up cover at rear of receiver.
3. Slide cover back and lift off.

To service the receiver from the bottom—

1. Pull locking handle down. Pull radio out of mounting frame. (see Figure 4).
2. Remove screws in bottom cover. Pry up cover at back of receiver.
3. Slide cover back and lift off.

To remove the receiver from the system frame—

1. Loosen the two Phillips-head retaining screws in front casting (see Figure 3), and pull casting away from system frame.
2. Remove the four screws in the back cover.
3. Remove the two screws holding the receiver at each end of the system frame.
4. Disconnect the antenna jack and the 20-pin connector from the front of the receiver, and slide the unit out of the system frame.

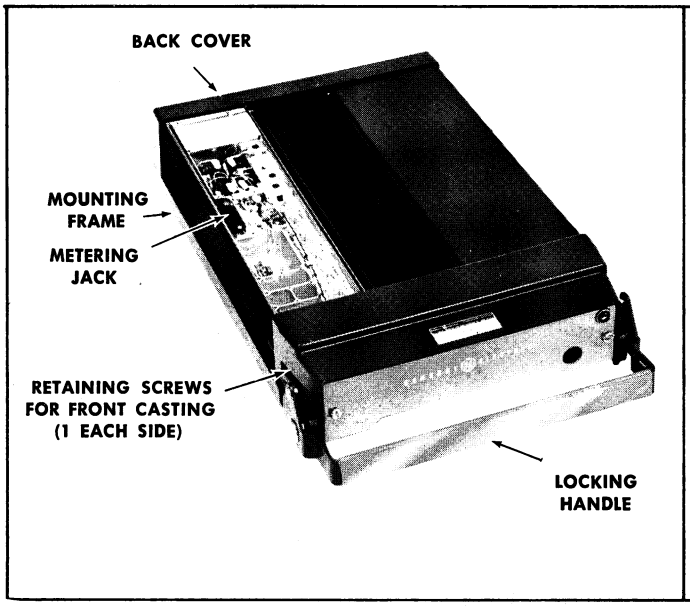


Figure 3 - Removing Top Cover

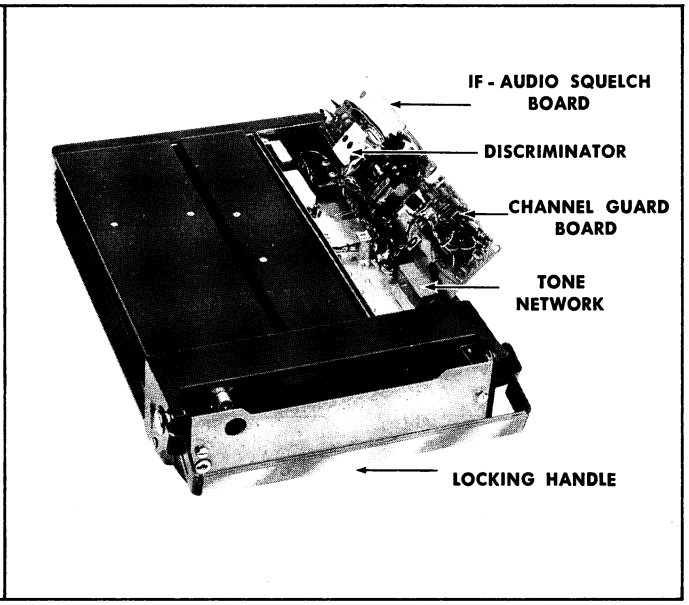


Figure 4 - Removing Bottom Cover

COMPLETE RECEIVER ALIGNMENT

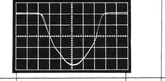
EQUIPMENT REQUIRED

1. GE Test Set Models 4EX3A10, 4EX8K11, station test meter panel, or 20,000 ohms-per-volt multimeter.
2. A 450 to 460 kHz source (GE Test Set Model 4EX7A10), and 470-512 MHz signal source. Connect a one-inch piece of insulated wire no larger than .065 inch to generator output probe.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set to receiver centralized metering jack J442, and set meter sensitivity switch to the TEST 1 or 1-volt position.
2. For a large change in frequency or a badly mis-aligned receiver, set crystal trimmer C9 on 1st OSC/MULT board (ER-42-K only) to mid-capacity. In multi-frequency receivers, set C10, C11 or C12 to mid-capacity as required.
3. In multi-frequency receivers where the maximum frequency spacing is less than 500 kHz, align the unit on channel F1. If the frequency spacing is greater than 500 kHz, align the receiver on the center frequency.
4. With Test Set in position J, check for regulated +10 volts. If using Multimeter, measure from C425 to C426.
5. If using Multimeter, connect the positive lead to J442-16 (ground).
6. Disable the Channel Guard.

ALIGNMENT PROCEDURE

STEP	METERING POSITION: GE Test Set or Meter Panel	METERING POSITION: Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			DISCRIMINATOR		
1.	A (DISC)	Pin 10	L1 and L2 (on IF-AUDIO & SQUELCH board)	Zero	Remove three screws and swing open the IF-AUDIO & SQUELCH board. Adjust L1 (disc primary) 1/2 turn counterclockwise from the bottom of coil. Next, apply a 455-kHz signal to J2 and J4 and adjust L2 (disc secondary) for zero meter reading.
2.	A (DISC)	Pin 10		See Procedure	Alternately apply a 450-kHz and 460-kHz signal and check for readings of at least 0.3 volt, but not more than 0.5 volt on GE Test Set. Both readings must be within .05 volt. Do not attempt to balance reading any closer than 0.05 volt.
			OSCILLATOR AND MULTIPLIERS		
3.	D (MULT-1)	Pin 4	L5 (1st OSC/MULT) and L3 (2nd MULT)	See Procedure	Tune L5 for maximum meter reading. Then tune L1 for minimum meter reading.
4.	G (MULT-1)	Pin 4	L5 (1st OSC/MULT) and L3 and L2 (2nd MULT)	Maximum	Tune L5, L1 and L2 for maximum meter reading. If two peaks occur while tuning L1 and L2, use the peak with the slug nearest the top of the coil.
5.	G (MULT-2)	Pin 4	C423	See Procedure	Adjust C423 for a small dip in meter reading.
6.	A (DISC)	Pin 10		Zero	Apply an on-frequency signal into Hole 411. Adjust the signal generator for discriminator zero.
7.	B (2nd IF AMP)	Pin 2	C423 and C424	Maximum	Apply an on-frequency signal as above. Tune C423 and C424 for maximum meter reading, keeping signal below saturation.
			RF SELECTIVITY		
8.	B (2nd IF AMP)	Pin 2	L3 (1st Mixer)	Maximum	Apply an on-frequency signal in Hole 411 and tune L3 for maximum meter reading. If two peaks occur, use the peak with the slug nearest the bottom of the coil.
9.	B (2nd IF AMP)	Pin 2	C415 thru C418	Maximum	Apply an on-frequency signal in the Hole shown below, keeping the signal below saturation. Tune C415 thru C418 for maximum meter reading as shown below: Insert Generator Probe In: — Peak 1. Hole 411 — C418 thru C417 2. Hole 410 — C415, C416 thru C417
10.	B (2nd IF AMP)	Pin 2	C414 thru C418, L3 (on 1st Mixer) and C410, C411 and C7 (on UHS receivers)	See Procedure	Apply an on-frequency signal to the receiver antenna jack. Tune C410, C411 and C7 on UHS receivers for maximum meter reading. On all receivers, tune C414 for maximum meter reading, and tune C415 thru C418 and L3 for maximum quieting.
			2ND MIXER & HI IF		
The 2nd mixer, and high IF circuits have been aligned at the factory and will normally require no further adjustment. If adjustment is necessary use the procedure outlined in STEPS 11, 12 and 13.					
NOTE: Refer to DATAFILE BULLETIN 1000-6 IF Alignment of Two-Way Radio FM Receivers for helpful suggestions on how to determine when IF alignment is required.					
11.	B (2nd IF AMP)	Pin 2	L3, L2, L1, T2 (2nd Mixer) and T1 (HI IF AMP)	Maximum	Apply on-frequency, unmodulated signal and tune L3, L2, L1, T2 (2nd mixer) and T1 (HI IF AMP) for maximum meter reading, keeping signal below saturation.
12.			L3, L2, L1, T2 (2nd Mixer) and T1 (HI IF AMP) 		Connect scope, signal generator, and detector as shown in Figure 7. Set signal generator level for 30-50 µv and modulate with 10 kHz at 20 Hz. With detector at the collector of Q8 (2nd mixer board output), tune for double trace as shown on scope pattern.
13.	A (DISC)	Pin 10		See Procedure	Check to see that discriminator idling voltage is within ±.06 volt of zero with no signal applied. Check to see that modulation acceptance bandwidth is between ±7.5 and 9 kHz.
			FREQUENCY ADJUSTMENT		
14.	Refer to the appropriate adjustment procedure for the ICOM or Standard Oscillator.				

FRONT END ALIGNMENT

EQUIPMENT REQUIRED

1. GE Test Set Model 4EX3A10, 4EX8K11 station test meter panel or 20,000 ohms-per-volt multimeter.
2. A 470-512 MHz signal source. Connect a one-inch piece of insulated wire no larger than 0.065 inch to generator output probe.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Connect Test Set to receiver centralized metering jack J442 and set meter sensitivity switch to the TEST 1 (or 1-volt position on 4EX8K11).
2. With Test Set in position J, check for regulated +10 volts. If using Multimeter, measure from C425 to C426.
3. If using Multimeter, connect the positive lead to J442-16 (ground).
4. Disable the Channel Guard.

ALIGNMENT PROCEDURE

STEP	METERING POSITION: GE Test Set or Meter Pane	METERING POSITION: Multimeter - at J442	TUNING CONTROL	METER READING	PROCEDURE
			OSCILLATOR AND MULTIPLIERS		
1.	D (MULT-1)	Pin 4	L5 (1st OSC/MULT) and L1 (2nd MULT)	See Procedure	Tune L5 for maximum meter reading. Then tune L1 for minimum meter reading.
2.	G (MULT-2)	Pin 4	L5 (1st OSC/MULT) and L1 and L2 (2nd MULT)	Maximum	Tune L5, L1 and L2 for maximum meter reading. If two peaks occur while tuning L1 and L2, use the peak with the slug nearest the top of the coil.
3.	G (MULT-2)	Pin 4	C423	See Procedure	Adjust C423 for a small dip in meter reading.
4.	A (DISC)	Pin 10		Zero	Apply on on-frequency signal into Hole 411. Adjust the signal generator for discriminator zero.
5.	B (2nd IF AMP)	Pin 2	C423 and C424	Maximum	Apply an on-frequency signal as above. Tune C423 and C424 for maximum meter reading, keeping signal below saturation.
			RF SELECTIVITY		
6.	B (2nd IF AMP)	Pin 2	L3, C415-C418	Maximum	Apply an on-frequency signal in Hole 411 and tune L3 and C415 thru C418 for maximum meter reading, keeping the signal below saturation. If two peaks occur when tuning L3, use the peak with the slug nearest the bottom of the coil.
7.	B (2nd IF AMP)	Pin 2	C414 thru C418, L3 (on 1st Mixer) and C410, C411 and C7 (on UHS receivers)	See Procedure	Apply on on-frequency signal to the receiver antenna jack. Tune C410, C411 and C7 on UHS receivers for maximum meter reading. On all receivers, tune C414 for maximum meter reading, and then tune C415 thru C418 and L3 for maximum quieting.
			FREQUENCY ADJUSTMENT		
8.	Refer to the appropriate adjustment procedure for the ICOM or Standard Oscillator.				

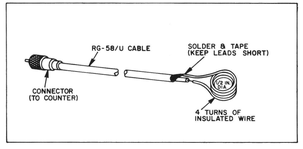


Figure 5 - Coaxial Cable and Test Loop

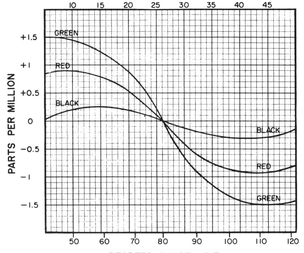
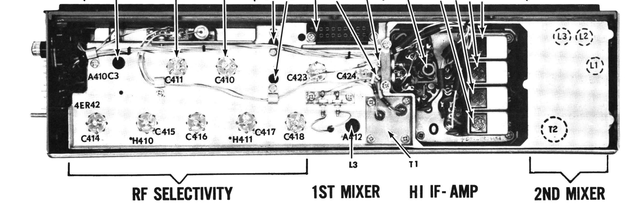
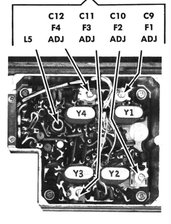
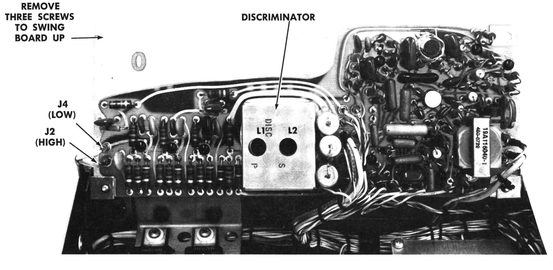


Figure 6 - ICOM Correction Curves





IF-AUDIO & SQUELCH



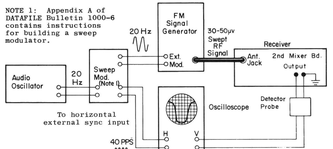


Figure 7 - Test Setup for 20-Hz Double-Trace Sweep Alignment

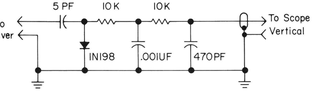


Figure 8 - Detector Probe for Sweep Alignment

FREQUENCY ADJUSTMENT

LBI-4434

STANDARD OSCILLATOR

METERING POSITION: 4EX3A10	METERING POSITION: Multimeter -at J442	TUNING CONTROL	METER READING	PROCEDURE
A (Disc)	Pin 10	C9 (on 1st OSC/MULT) C10, C11 and C12 for multi-frequency	Zero	Apply an on-frequency signal to the antenna jack. Tune C9 for zero discriminator reading. In multi-frequency units, tune C10, C11 or C12 as required. NOTE For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90°F.

ICOM MODULE

Due to the high stability of the ICOM module, it is not recommended that zero discriminator be used as the indication for setting the oscillator frequency. Instead, measure the ICOM frequency as described in in the following procedure.

EQUIPMENT REQUIRED:

1. Frequency Counter capable of measuring the 70-80 MHz frequency range. (The counter should have an accuracy of 0.4 part-per million.)
2. Coaxial cable with test loop as described in Figure 5.
3. Mercury thermometer.

PROCEDURE:

1. Check the ICOM temperature by taping the mercury thermometer to the side of the ICOM.
2. Connect the frequency counter to L5 (on the 1st Osc/Mult) using the 4-turn test loop and cable shown in Figure 5.
3. If the ICOM temperature is 80°F (74°F) or 26.5°C (22°C), the frequency indication on the counter should be 4 times the frequency stenciled on the ICOM case. Adjust the ICOM trimmer (if necessary) to obtain this frequency.
4. If the temperature is not within the 80°F (74°F) or 26.5°C (22°C) range, use the correction curves of Figure 6 for setting the ICOM frequency as follows:
   a. Check the color dot beneath the GE emblem and select the matching curve to determine the correction factor in parts-per-million (PPM).
   b. Multiply the frequency stenciled on the ICOM by 4 and then multiply this figure by the correction factor (from Figure 6) observing the sign (±) given to the correction factor.
   c. The frequency measured at L5 should be 4 times the ICOM frequency ± the correction factor. Adjust the ICOM trimmer (if required) to obtain this frequency.

FOR EXAMPLE

ICOM Frequency - 18.233333 MHz
ICOM Color Dot - Green
Ambient Temperature - 25°C (95°F)
Correction Factor - -1.15 PPM
(From Figure 6)

Multiply ICOM Frequency by 4:
(18.233333 MHz x 4 = 72.933332 MHz)

Multiply preceding figure by correction factor:
(72.933 MHz x -1.15 PPM = -83.87 hertz (or -84 hertz)

Set the frequency measured at L5 for 72.933248 MHz:

72.933332 MHz
- .000084 MHz
= 72.933248 MHz

ALIGNMENT PROCEDURE

470—512 MHz MASTR RECEIVER MODELS 4ER42K10-33 & 4ER42L10-33

TEST PROCEDURES

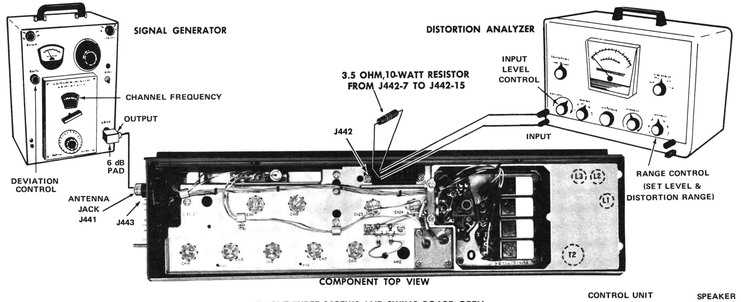
These Test Procedures are designed to help you to service a receiver that is operating---but not properly. The problems encountered could be low power, poor sensitivity, distortion, limiter not operating properly, and low gain. By following the sequence of test steps starting with Step 1, the defect can be quickly localized. Once the defective stage is pin-pointed, refer to the "Service Check" listed to correct the problem. Additional corrective measures are included in the Troubleshooting Procedure. Before starting with the Receiver Test Procedures, be sure the receiver is tuned and aligned to the proper operating frequency.

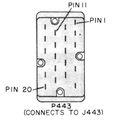
TEST EQUIPMENT REQUIRED

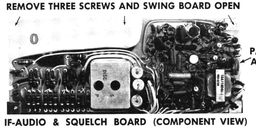
- Distortion Analyzer similar to: Heath IM-12
- Signal Generator similar to: Measurements M-560
- 6-dB attenuation pad, and 3.5-ohm, 10-watt resistor

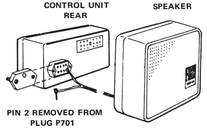
PRELIMINARY ADJUSTMENTS

1. Connect the test equipment to the receiver as shown for all steps of the receiver Test Procedure.
2. Turn the SQUELCH control fully clockwise for all steps of the Test Procedure.
3. Turn on all of the equipment and let it warm up for 20 minutes.









STEP 1
AUDIO POWER OUTPUT AND DISTORTION

TEST PROCEDURE

Measure Audio Power Output as follows:

A. Apply a 1,000-microvolt, on-frequency test signal modulated by 1,000 hertz with ±3.3 kHz deviation to antenna jack J441.

B. With Five-Watt Speaker:

Disconnect speaker lead pin from J701-2 (on rear of Control Unit).

Connect a 3.5-ohm load resistor from J442-15 to J442-7. Connect the Distortion Analyzer input across the resistor as shown.

OR

With Handset:

Lift the handset off of the hookswitch. Connect the Distortion Analyzer input from J442-15 to J442-7.

C. Adjust the VOLUME control for five-watt output (4.18 VRMS using the Distortion Analyzer as a VTVM).

D. Make distortion measurements according to manufacturer's instructions. Reading should be less than 5%. If the receiver sensitivity is to be measured, leave all controls and equipment as they are.

SERVICE CHECK

If the distortion is more than 5%, or maximum audio output is less than five watts, make the following checks:

E. Battery and regulator voltage---low voltage will cause distortion. (Refer to Receiver Schematic Diagram for voltages.)

F. P.A. Bias Adjust (R43) -- Turn the SQUELCH control fully counterclockwise. Then connect a milliammeter in series with the +12 volt lead at P443-11. With no signal in, adjust R43 for a reading of approximately 20 milliamps. This adjustment should not be necessary unless an output transistor has been re-replaced.

G. Audio Gain (Refer to Receiver Troubleshooting Procedure).

H. Discriminator Alignment (Refer to Receiver Alignment on reverse side of page).

STEP 2
USABLE SENSITIVITY (12-dB SINAD)

If STEP 1 checks out properly, measure the receiver sensitivity as follows:

A. Apply a 1000-microvolt, on-frequency signal modulated by 1000 Hz with 3.3-kHz deviation to J441.

B. Place the RANGE switch on the Distortion Analyzer in the 200 to 2000-Hz distortion range position (1000-Hz filter in the circuit). Tune the filter for minimum reading or null on the lowest possible scale (100%, 30%, etc.)

C. Place the RANGE switch to the SET LEVEL position (filter out of the circuit) and adjust the input LEVEL control for a +2 dB reading on a mid range (30%).

D. While reducing the signal generator output, switch the RANGE control from SET LEVEL to the distortion range until a 12-dB difference (-2 dB to -10 dB) is obtained between the SET LEVEL and distortion range positions (filter out and filter in).

E. The 12-dB difference (Signal plus Noise and Distortion to noise plus distortion ratio) is the "usable" sensitivity level. The sensitivity should be less than rated 12 dB SINAD specification with an audio output of at least 2.5 watts (2.9 volts RMS across the 3.5-ohm receiver load using the Distortion Analyzer as a VTVM).

F. Leave all controls as they are and all equipment connected if the Modulation Acceptance Bandwidth test is to be performed.

SERVICE CHECK

If the sensitivity level is more than rated 12 dB SINAD, check the alignment of the RF stages as directed in the Alignment Procedure, and make the gain measurements as shown on the Troubleshooting Procedure.

STEP 3
MODULATION ACCEPTANCE BANDWITH (IF BANDWITH)

If STEPS 1 and 2 check out properly, measure the bandwidth as follows:

A. Set the Signal Generator output for twice the microvolt reading obtained in the 12-dB SINAD measurement.

B. Set the RANGE control on the Distortion Analyzer in the SET LEVEL position (1000-Hz filter out of the circuit), and adjust the input LEVEL control for a +2 dB reading on the 30% range.

C. While increasing the deviation of the Signal Generator, switch the RANGE control from SET LEVEL to distortion range until a 12-dB difference is obtained between the SET LEVEL and distortion range readings (from +2 dB to -10 dB).

D. The deviation control reading for the 12-dB difference is the Modulation Acceptance Bandwidth of the receiver. If should be more than ±7.5 kHz (but less that ±9.5 kHz).

SERVICE CHECK

If the Modulation Acceptance Bandwidth test does not indicate the proper width, make gain measurements as shown on the Receiver Troubleshooting Procedure.

STEP 1-QUICKCHECKS

TEST SET CHECKS

These checks are typical voltage readings measured with GE Test Set Model 4EX3A10 in the Test 1 position, or Model 4EX8K10 or 11 in the 1-volt position.

Metering Position	Reading with No Signal in	Reading with 1 μv unmodulated input
A Disc idling	Less than ±.05 VDC	
B 2nd IF	.05 VDC	0.2 VDC
C 1st Lim	0.6 VDC	0.8 VDC
D Mult 1	1.0 VDC	
G Mult 2	0.3 VDC	
J Regulated +10 Volts	10 VDC	

SYMPTOM CHECKS

SYMPTOM	PROCEDURE
NO SUPPLY VOLTAGE	• Check power connections and continuity of supply leads, and check fuse in power supply. If fuse is blown, check receiver for short circuits.
NO REGULATED 10-VOLTS	• Check the 12-volt supply. Then check regulator circuit (See Troubleshooting Procedure for Power Supply).
LOW 1ST LIM READING	• Check supply voltages and then check oscillator reading at J442-4 & 5 as shown in STEP 2A. • Make SIMPLIFIED VTVM GAIN CHECKS from 2nd Mixer through 1st Limiter stages as shown in STEP 2A.
LOW OSCILLATOR/MULTIPLIER READINGS	• Check alignment of Oscillator (Refer to Front End Alignment Procedure). • Check voltage readings of 1st Oscillator/Multiplier Q1/Q2. • Check crystal Y1.
LOW RECEIVER SENSITIVITY	• Check Front End Alignment (Refer to Receiver Alignment Procedure). • Check antenna connections, cable and relay. • Check 1st and 2nd Oscillator injection voltage. • Check voltage readings of RF Amp, 1st Mixer and HI IF Amp. • Make SIMPLIFIED GAIN CHECKS (STEP 2A).
LOW AUDIO	• Check Audio PA (Q410 & Q411) voltage readings on schematic diagram. • Make simplified gain and waveform checks of audio and squelch stages (Steps 2A and 2B). • Make unsquelched voltage readings in Audio section (Refer to Receiver Schematic Diagram). • Check voltage readings on Channel Guard board.
HIGH DISTORTION AT LOW AUDIO LEVELS (50 MW)	• Set PA bias adjust R43 as specified under Service checks in STEP 1 of TEST PROCEDURES.
IMPROPER SQUELCH OPERATION	• Check voltage readings of Squelch circuit (Refer to Receiver Schematic Diagram). • Make gain and waveform checks of audio and squelch stages (Steps 2A and 2B).
DISCRIMINATOR IDLING TOO FAR OFF ZERO	• See if discriminator zero is in center of IF bandpass.

STEP 3-VOLTAGE RATIO READINGS

EQUIPMENT REQUIRED:

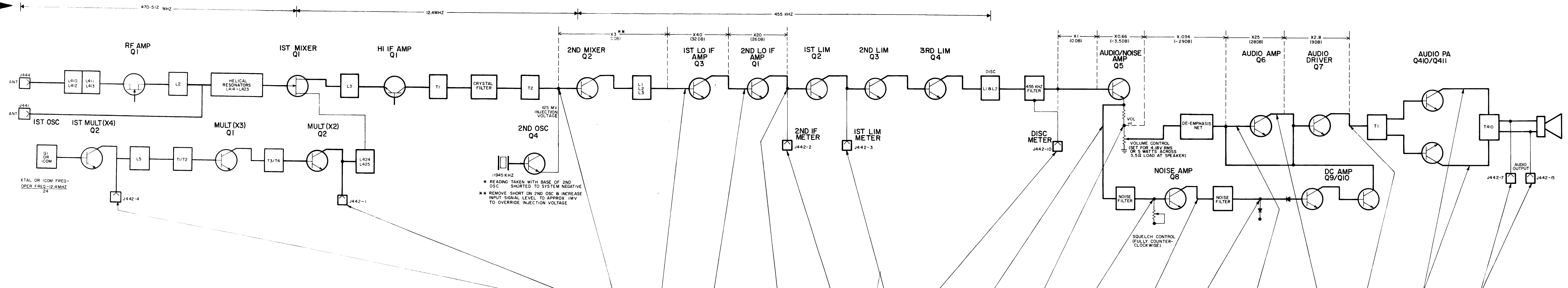
1. RF Voltmeter (Similiar to Boonton Model 91-CA or Millivac Type MV-18 C).
2. Signal on receiver frequency (below saturation). Correct frequency can be determined by zeroing the discriminator. Use 1,000 Hertz signal with 3.3 kHz deviation for audio stage.

PROCEDURE

1. Apply probes to input of stage and system negative (-10 VDC). Take voltage reading (E_1).
2. Move probes to input of following stage and system negative. Take reading (E_2).
3. Convert readings by means of the following formula:

$$\text{Volatge Ratio} = \frac{E_2}{E_1}$$

4. Check results with typical voltage ratios shown on diagram.



STEP 2A-SIMPLIFIED VTVM GAIN CHECKS

EQUIPMENT REQUIRED:

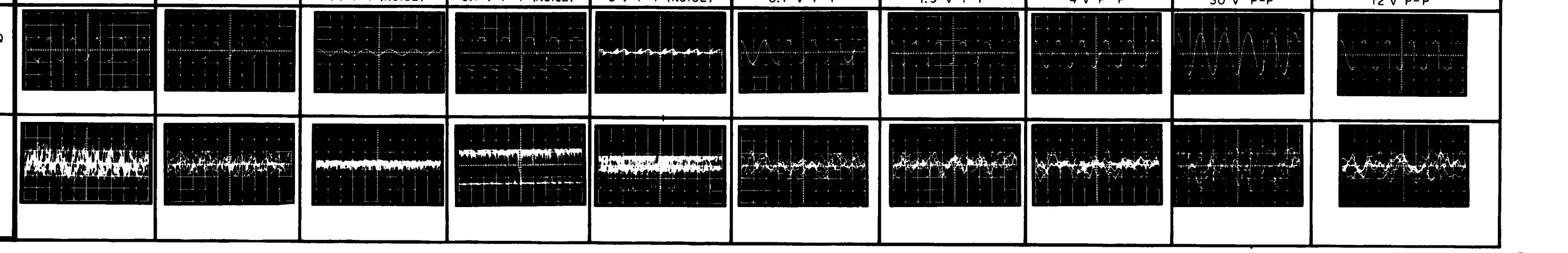
1. VTVM-AC & DC
2. Signal Generator (measurements Model 803 or equiv.)

PRELIMINARY STEPS:

1. Set VOLUME control for 4.18 volts across 3.5-ohm load. If this cannot be obtained, set to approx. 70% of max. rotation.
2. Set SQUELCH control fully counterclockwise.
3. Receiver should be properly aligned.
4. Connect VTVM between system negative and points indicated by arrow (except for 1st MULT which references chassis ground).

SIGNAL GENERATOR INPUT AT J441 MAINTAIN SETTING AT DISCRIMINATOR ZERO			UNMODULATED	UNMODULATED	UNMODULATED	UNMODULATED	1 MICROVOLT UNMODULATED	NO SIGNAL INPUT	STANDARD SIGNAL- 1 MILLIVOLT AT RCVR FREQ, MODULATED BY 1KHZ WITH 3.3KHZ DEV.(10KHZ W.B)	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL	STANDARD SIGNAL
PROCEDURE			INCREASE GENERATOR OUTPUT UNTIL VTVM READING ON 1.5 V SCALE DECREASES BY 50 MV	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES BY 5 %	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES BY 5 %	INCREASE SIGNAL GENERATOR OUTPUT FROM ZERO UNTIL VTVM READING DECREASES BY 5 %													CONNECT VTVM OR SCOPE ACROSS 3.5Ω LOAD BETWEEN J442-7 AND J442-15 WITH SPEAKER DISCONNECTED.
READING	0.8 VDC	0.25 VDC	GENERATOR OUTPUT SHOULD BE APPROX 20 MILLIVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 600 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 5 MICROVOLTS	GENERATOR OUTPUT SHOULD BE APPROX 0.3 MICROVOLTS	-0.6 VDC	- 2 VDC	0.8 VAC	0.75 VAC	0.55 VAC	0.15 VAC	2.3 VAC	0.05 VAC		0.5 VAC	1.4 VAC	10 VAC	4.18 VAC

SCOPE SETTING											
SCOPE SETTING	HORIZONTAL	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV	0.5 MS/DIV
	VERTICAL	1 VOLT/DIV	1 VOLT/DIV	1 VOLT/DIV	2 VOLTS/DIV	0.5 VOLTS/DIV	50 MILLIVOLTS/DIV	1 VOLT/DIV	2 VOLTS/DIV	10 VOLTS/DIV	5 VOLTS/DIV
PEAK-TO-PEAK VOLTAGE		2 V P-P	1.4 V P-P	1 V P-P (NOISE)	5.7 V P-P (NOISE)	3 V P-P (NOISE)	0.1 V P-P	1.9 V P-P	4 V P-P	30 V P-P	12 V P-P
STANDARD SIGNAL (1 MILLIVOLT AT RECEIVER FREQ MODULATED BY 1KHZ WITH 3.3 KHZ DEVIATION (10 KHZ WIDE BAND))											
NOISE WAVE FORM (NO SIGNAL INPUT)											



RC-1828C

STEP 2B-AUDIO & SQUELCH WAVEFORMS

EQUIPMENT REQUIRED:

1. Oscilloscope.
2. Signal Generator (measurements Model 803 or equivalent).

PRELIMINARY STEPS:

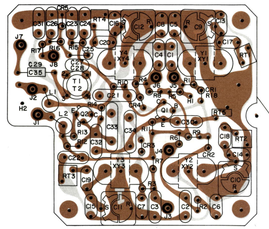
1. Set VOLUME control for 4.18 volts across 3.5-ohm load. If this cannot be obtained, set to approx. 70% of max. rotation.
2. Set SQUELCH control fully counterclockwise.
3. Receiver should be properly aligned.
4. Connect oscilloscope between system negative and points indicated by arrow.

TROUBLESHOOTING PROCEDURE

470—512 MHz RECEIVER

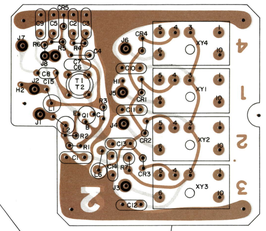
MODELS 4ER42K10-33 & 4ER42L10-33

IST OSCILLATOR/MULTIPLIER
470-512 MHZ
A415-1 FREQ - A418
A416-2 FREQ - A419
A417-4 FREQ - A420



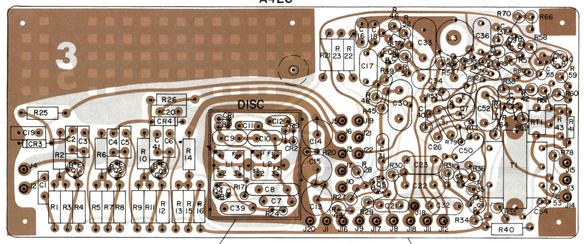
(19B204934, Sh. 1, Rev. 1)
(19B204934, Sh. 2, Rev. 1)

IST OSCILLATOR/MULTIPLIER (WITH ICOM)
470-512 MHZ
A432-1 FREQ - A434
A433-4 FREQ - A435



(19B216041, Sh. 1, Rev. 2)
(19B216041, Sh. 2, Rev. 2)

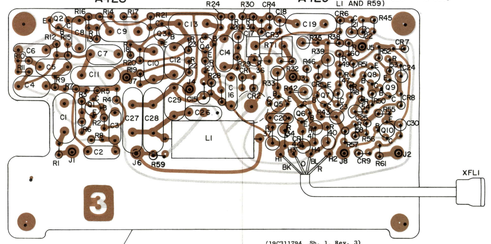
IF-AUDIO & SQUELCH BOARD
A426



(19C311803, Sh. 1, Rev. 3)
(19C311803, Sh. 2, Rev. 5)

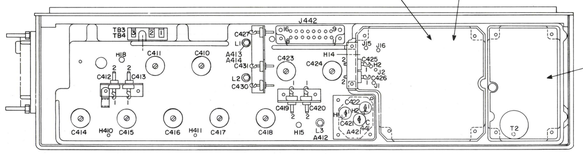
ENCODER-DECODER
A428

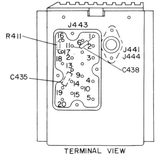
TONE REJECT FILTER
A429 (CONSISTS OF C26 THRU C29, L1 AND R59)



(19C311794, Sh. 1, Rev. 3)
(19C311794, Sh. 2, Rev. 3)

TOP VIEW
CENTRALIZED METERING JACK



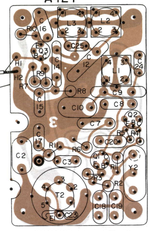


TERMINAL VIEW

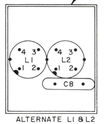
RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

TO A426-J4
TO A426-J2

2ND MIXER
A424



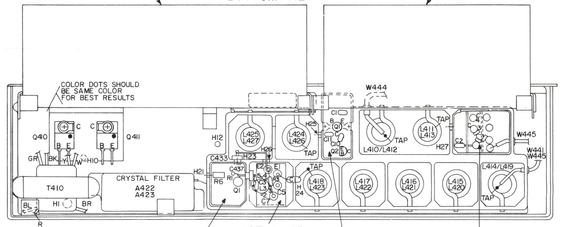
(19B216045, Sh. 1, Rev. 3)
(19B216045, Sh. 2, Rev. 3)



ALTERNATE L1 & L2

PIN NUMBER MARKING ON SIDE OF COIL CAN OR COLOR DOT IDENTIFIES PIN NUMBER 1 ON DISCRIMINATOR AND 2ND MIXER COILS.

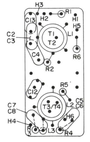
BOTTOM VIEW



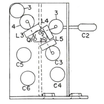
IST MIXER
A412

HI IF AMP
A421

MULT
A413/A414

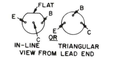


RF AMP
A410/A411



TRANSISTOR LEAD IDENTIFICATION

FET LEAD IDENTIFICATION FOR RF AMP AND IST MIXER



IN-LINE TRIANGULAR
VIEW FROM LEAD END

NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

(19B821992, Rev. 0)

OUTLINE DIAGRAM

470—512 MHz RECEIVER
MODELS 4ER42K10-33 & 4ER42L10-33

PARTS LIST

LBI-4433

470-512 MHz RECEIVERS
4ER42K10-33, 4ER42L10-33

SYMBOL	GE PART NO.	DESCRIPTION
A410 and A411		RF AMPLIFIER 19C317950G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5493392P5	Ceramic, feed-thru: 220 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C4 thru C6	5493392P107	Ceramic, stand-off: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type SS5D.
		- - - - - - - - - - INDUCTORS - - - - - - - -
L1 and L2	19B209420P1	Coil, RF: 0.10 µh ±5%, 0.08 ohms DC res max; sim to Jeffers 4416-1J.
L3 thru L5	19A116632P1	Torridal core.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116154P1	N Channel, field effect.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1 and R2	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
A412		FIRST MIXER ASSEMBLY 19C311974G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P312	Ceramic disc: 18 pf ±10%, 500 VDCW, temp coef -150 PPM.
C2		(Part of L3).
C3	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	19B209243P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C5	5493392P107	Ceramic, stand-off: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type SS5D.
C6	19B209243P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C7	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen Bradley Type FA5C.
C8		(Part of L3).
		- - - - - - - - - - TERMINALS - - - - - - - - -
E1 and E2	19B209055P8	Terminal, feed-thru.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A127430G1	Choke.
L2		(Part of L3).
L3	19B216440G1	Coil assembly, includes:
C2	5496218P249	Capacitor, ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C8	19A116114P12	Capacitor, ceramic: 3.3 pf ±5%, 100 VDCW; temp coef 0 PPM.
L2	19B209420P113	Coil, RF: 1 µh ±10%, 0.74 ohms DC res max; sim to Jeffers 4426-6.
	5491798P8	Tuning slug.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116154P1	N Channel, field effect.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1	3R152P302J	Composition: 3000 ohms ±5%, 1/4 w.
R2 and R3	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
A413 and A414		MULTIPLIER BOARD ASSEMBLY A413 19B219100G1 A414 19B219100G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116655P12	Ceramic disc: 330 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C2		(Part of T1).
C3		(Part of T2).
C4	19A116720P149	Ceramic disc: 220 pf ±10%, 500 VDCW, temp coef -3300 PPM.
C5		(Part of T3).
C6		(Part of T4).
C7		(Part of T3).
C8		(Part of T4).
C9	19A116655P13	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C10	19A116720P149	Ceramic disc: 220 pf ±10%, 500 VDCW, temp coef -3300 PPM.
C11	5496218P243	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef -80 PPM.
C12 and C13	19A116655P13	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C14	5496218P544	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -330 PPM.
C15	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1		(Part of T1 and T2).
L2		(Part of T3 and T4).
L3	19B209420P1	Coil, RF: 0.10 µh ±5%, 0.08 ohms DC res max; sim to Jeffers 4416-1J.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115329P1	Silicon, NPN.
Q2	19A115991P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R2	3R152P181J	Composition: 180 ohms ±5%, 1/4 w.
R3	3R152P100K	Composition: 10 ohms ±10%, 1/4 w.
R4	3R152P471K	Composition: 470 ohms ±10%, 1/4 w.
R5	3R152P680J	Composition: 68 ohms ±5%, 1/4 w.
R6	3R152P273K	Composition: 27,000 ohms ±10%, 1/4 w.
R7	3R152P100K	Composition: 10 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 and T2		COIL ASSEMBLY T1 19B219098G1 T2 19B219098G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	5496218P346	Ceramic disc: 20 pf ±5%, 500 VDCW, temp coef -150 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1		(Part of T1 and T2).
	5491798P7	Tuning slug.
T3 and T4		COIL ASSEMBLY T3 19B219099G1 T4 19B219099G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C5	5496218P236	Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C6	5496218P235	Ceramic disc: 4.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C7 and C8	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L2		(Part of T3 and T4).
	5493185P5	Tuning slug.
A415 thru A420		FIRST OSCILLATOR ASSEMBLY A415 19C317606G1 A416 19C317606G2 A417 19C317606G3 A418 19C317606G4 A419 19C317606G5 A420 19C317606G6
		- - - - - - - - - CAPACITORS - - - - - - - -
C1 thru C4	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5 thru C8	19A116656P33J7	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C9 thru C12	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C13 thru C16	19A116656P9G0	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17 thru C20	19A116656P5G0	Ceramic disc: 5 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C21	19A116655P22	Ceramic disc: 2700 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C22 thru C24	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C25	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
C26	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C27		(Part of T1).
C28		(Part of T2).
C29	5491601P130	Phenolic: 3.3 pf ±5%, 500 VDCW.
C30	19A116656P39J0	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef 0 PPM.
C31	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C32	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C33	19A116656P100J3	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -330 PPM.
C34	19A116656P150J1	Ceramic disc: 150 pf ±5%, 500 VDCW, temp coef -150 PPM.
C35	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR4	19A115348P1	Silicon.
CR5	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J8	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1 and L2	7488079P16	Choke, RF: 10 µh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7K.
L3		(Part of T1 and T2).
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q1 and Q2	19A115330P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1 thru R4	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R5 thru R8	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R9	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R13	3R152P151J	Composition: 150 ohms ±5%, 1/4 w.
R14	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R17 and R18	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R20	3R152P270K	Composition: 27 ohms ±10%, 1/4 w.
		- - - - - - - - - THERMISTORS - - - - - - - -
RT1 thru RT5	19B209284P7	Disc: 62 ohms res nominal at 25°C, color code violet.
		- - - - - - - - - TRANSFORMERS - - - - - - -
T1 and T2		COIL ASSEMBLY T1 19B219102G1 T2 19B219102G2
		- - - - - - - - - CAPACITORS - - - - - - - -
C27	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C28	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L3	19A121728P1	Coil. Includes tuning slug 5491798P5.
	5491798P7	Tuning slug.
		- - - - - - - - - - SOCKETS - - - - - - - - -
XY1 thru XY4		Refer to Mechanical Parts (RC-2422).
		- - - - - - - - - - CRYSTALS - - - - - - - -
		NOTE: When reordering give GE Part No. and specify exact freq needed. Crystal freq = $\frac{\text{Oper. Freq -12.4 MHz}}{24}$.
Y1 thru Y4	19B206576P7	Quartz: freq range 17925.001 to 20685.000 KHz, temp range -30°C to +85°C. (470-494 MHz)
A421		IF AMPLIFIER ASSEMBLY 19B216356G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116655P19	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2	7489162P21	Silver mica: 56 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C3	5496218P650	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -470 PPM.
C4	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C5 and C6	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115440P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1	3R152P301J	Composition: 300 ohms ±5%, 1/4 w.
R2	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R3	3R152P152J	Composition: 1500 ohms ±5%, 1/4 w.
R4	3R152P682J	Composition: 6800 ohms ±5%, 1/4 w.
R5	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R6	3R152P301J	Composition: 300 ohms ±5%, 1/4 w.
R7	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T1	19B216372G1	Coil assembly. Includes tuning slug 5491798P7.
A422		CRYSTAL FILTER ASSEMBLY 19B204616G8
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL7	19C304358G1	Bandpass filter.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R10	3R152P512J	Composition: 5100 ohms ±5%, 1/4 w.
R11	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
A424		SECOND MIXER ASSEMBLY 19B216119G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C3	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C7 and C8	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C9	5496219P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C10	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C12	5496219P369	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C14	5496219P471	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -220 PPM.
C15	7491395P109	Ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC Type JL.
C16	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C17	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C18	5490008P25	Silver mica: 82 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C19	5490008P19	Silver mica: 47 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C20	5490008P1	Silver mica: 5 pf ±0.5%, 500 VDCW; sim to Electro Motive Type DM-15.
C23		(Part of T2).
C24 and C25	5496219P43	Ceramic disc: 13 pf ±5%, 500 VDCW, temp coef 0 PPM.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1	4033513P4	Contact, electrical; sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	19C311181G3	Coil assembly.
L2 and L3	19A115711P1	Transformer, freq: 455 KHz; sim to Automatic Mfg EX12670.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1	4029840P2	Contact, electrical: sim to Amp 42827-2.
P2	4029840P1	Contact, electrical: sim to Amp 41854.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q2	19A115245P1	Silicon, NPN.
Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4	19A115245P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R3	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R4	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R5	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R6	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w.
R7	3R77P123K	Composition: 12,000 ohms ±10%, 1/2 w.
R8	3R77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R9	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R10	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
R11	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T2		COIL ASSEMBLY 19B216120G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C23	5496218P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
	5491798P3	Tuning slug.
		- - - - - - - - - - CRYSTALS - - - - - - - - - -
Y2	19A110398P1	Quartz: freq 11945.00 KHz, temp range -30°C to +75°C.
A426		IF AUDIO AND SQUELCH BOARD 19D413129G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C3	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5496219P717	Ceramic disc: 47 pf ±10%, 500 VDCW, temp coef -750 PPM.
C5 and C6	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C7	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C8	19A116656P180J1	Ceramic disc: 180 pf ±5%, 500 VDCW, temp coef -150 PPM.
C9 and C10	5490008P37	Silver mica: 270 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C11	5496219P656	Ceramic disc: 51 pf ±5%, 500 VDCW, temp coef -470 PPM.
C12	5494481P108	Ceramic disc: 470 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C13	19A115680P107	Electrolytic: 100 µf +150% -10%, 15 VDCW; sim to Mallory Type TT.
C14 and C15	19A115680P104	Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C16	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C17	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C18	5494481P108	Ceramic disc: 470 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C19 and C20	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C21	19A116080P3	Polyester: 0.022 µf ±20%, 50 VDCW.
C22	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C23	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
C25	5496267P6	Tantalum: 33 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C26	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C27	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C30	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C31	19A116080P102	Polyester: 0.015 µf ±10%, 50 VDCW.
C32	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C33	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C34	4029003P207	Silver mica: 1830 pf ±2%, 500 VDCW; sim to Electro Motive Type DM-20.
C35	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C36	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C37	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C39	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW.
C40	5496267P28	Tantalum: 0.47 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C41	5490008P129	Silver mica: 120 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C50	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C51	19A116655P22	Ceramic disc: 2700 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C52	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C53 and C54	5496267P213	Tantalum: 2.2 µf ±10%, 20 VDCW; sim to Sprague Type 150D.
C55	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR6	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J22	4033513P4	Contact, electrical; sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A115711P6	Transformer, freq: 455 KHz; sim to TOKO PEFCN-14733-CX12.
L2	19A115711P7	Transformer, freq: 455 KHz; sim to TOKO PEFCN-14734-BNL2.
L3	19A127134G1	Choke.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 thru Q6	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q7	19A115300P4	Silicon, NPN; sim to Type 2N3053.
Q8	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q9	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q10	19A116774P1	Silicon, NPN; sim to Type 2N5210.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R2	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R3	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R4	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R5	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R6	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R7	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R8	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R9	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R10	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R11	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R12	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R13	3R77P272K	Composition: 2700 ohms ±10%, 1/2 w.
R14	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R15	3R77P333J	Composition: 33,000 ohms ±5%, 1/2 w.
R16	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R17	3R152P471J	Composition: 470 ohms ±5%, 1/4 w.
R18 and R19	3R152P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R20	3R152P472K	Composition: 4700 ohms ±10%, 1/4 w.
R21 and R22	3R77P362J	Composition: 3600 ohms ±5%, 1/2 w.
R23	3R77P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R24	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R25 and R26	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R27 and R28	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R29	3R77P182J	Composition: 1800 ohms ±5%, 1/2 w.
R30 and R31	3R77P821J	Composition: 820 ohms ±5%, 1/2 w.
R33	3R77P912J	Composition: 9100 ohms ±5%, 1/2 w.
R34	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w.
R35	3R77P330K	Composition: 33 hms ±10%, 1/2 w.
R36	3R77P681J	Composition: 680 ohms ±5%, 1/2 w.
R38	3R77P752J	Composition: 7500 ohms ±5%, 1/2 w.
R39	3R77P820J	Composition: 82 ohms ±5%, 1/2 w.
R40	3R77P241J	Composition: 240 ohms ±5%, 1/2 w.
R41	3R152P240J	Composition: 24 ohms ±5%, 1/4 w.
R42	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.
R43	19B209358P101	Variable, carbon film: approx 25 to 250 ohms ±10%, 0.2 w; sim to CTS Type X-201.
R44	19B209022P101	Wirewound: 0.27 ohms ±10%, 2 w; sim to IRC Type BWH.
R45	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
R46	3R77P913J	Composition: 91,000 ohms ±5%, 1/2 w.
R48	19A116278P249	Metal film: 3160 ohms ±2%, 1/2 w.
R49	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R50	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R51	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R52	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R54	3R77P822J	Composition: 8200 ohms ±5%, 1/2 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

MODELS WITH DISCRETE CIRCUIT OSCILLATOR	MODELS WITH VCOM OSCILLATOR	NO. OF FREQS.	FREQ. RANGE 470-494 LO 494-512 HI	CHANNEL GUARD	U.H.F. RECEIVER A410/A411 PRE ENT.
4ER42K10	4ER42L10	1	LO		
4ER42K11	4ER42L11	1	HI		
4ER42K12		2	LO		
4ER42K13		2	HI		
4ER42K14	4ER42L14	4	LO		
4ER42K15	4ER42L15	4	HI		
4ER42K16	4ER42L16	1	LO	X	
4ER42K17	4ER42L17	1	HI	X	
4ER42K18		2	LO	X	
4ER42K19		2	HI	X	
4E R42K20	4ER42L20	4	LO	X	
4ER42K21	4ER42L21	4	HI	X	
4ER42K22	4ER42L22	1	LO		X
4ER42K23	4ER42L23	1	HI		X
4ER42K24		2	LO		X
4ER42K25		2	HI		X
4ER42K26	4ER42L26	4	LO		X
4ER42K27	4ER42L27	4	HI		X
4ER42K28	4ER42L28	1	LO	X	X
4ER42K29	4ER42L29	1	HI	X	X
4ER42K30		2	LO	X	X
4ER42K31		2	HI	X	X
4ER42K32	4ER42L32	4	LO	X	X
4ER42K33	4ER42L33	4	HI	X	X

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED. ANY RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY pF=MICROMICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR HY=HENRYS.

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MEASURED TO SYSTEM SPECIFICATIONS WITH TEST SET MODEL 4EX340 OR A 20,000 OHM-PER-VOLT METER.

S= NO SIGNAL IN WITH SQUELCH CONTROL FULLY COUNTERCLOCKWISE (MAXIMUM SQUELCH)
US=SQUELCH CONTROL FULLY CLOCKWISE WITH A ONE MILLIVOLT MODULATED SIGNAL (UNSQUELCHED) AND 5 WATT AUDIO OUTPUT.

NOTE:
TO CHECK FOR PROPER OPERATION OF 1ST MIXER A412, MEASURE CURRENT IOV CIRCUIT (W-R LEAD). CURRENT WITH FIRST OSC XTAL REMOVED SHOULD BE 0.6 TO 0.8MA. CURRENT WITH FIRST OSC OPERATING PROPERLY, SHOULD BE 1.2 TO 1.6 MA.

★THESE ARE ONLY PARTS PRESENT ON A429.
● LOW SPLIT 470-494 MHZ
▲ HIGH SPLIT 494-512 MHZ
✖ LEADS TO BE TERMINATED AS SHORT AS POSSIBLE.
■ VALUE OF A428-R47 IS DETERMINED BY TEST (SEE TEST SPEC 19A127/82)

	REV
PLI9E500928G1	
PLI9E500972G2	
PLI9E500932G3	
PLI9E500975G4	
A424 PLI9821613953	
A426 PLI9041312953	C
A429 4EX16A10	A
A429 PLI9C311797G2	

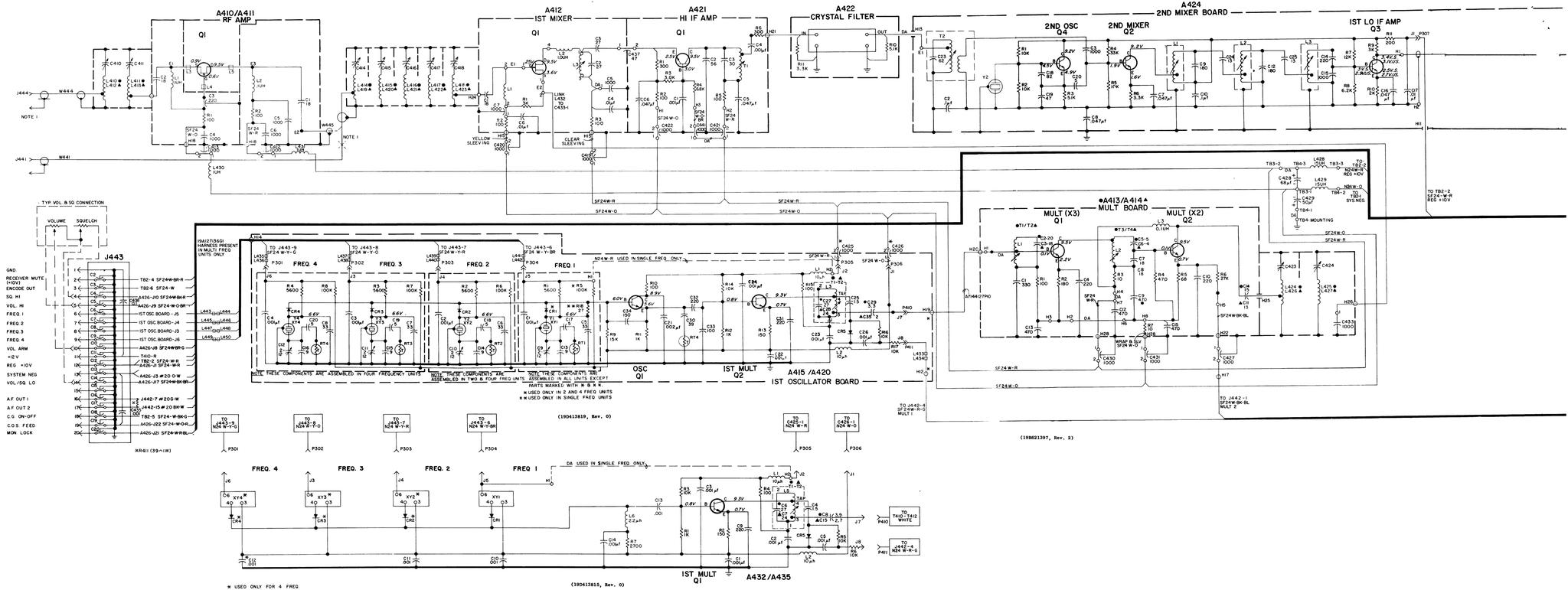
SYM NO.	PARTS LIST	REV. LETTER
A410	PLI9C311760G61	
A416	PLI9C311760G62	
A417	PLI9C311760G63	
A418	PLI9C311760G64	
A419	PLI9C311760G65	
A420	PLI9C311760G66	

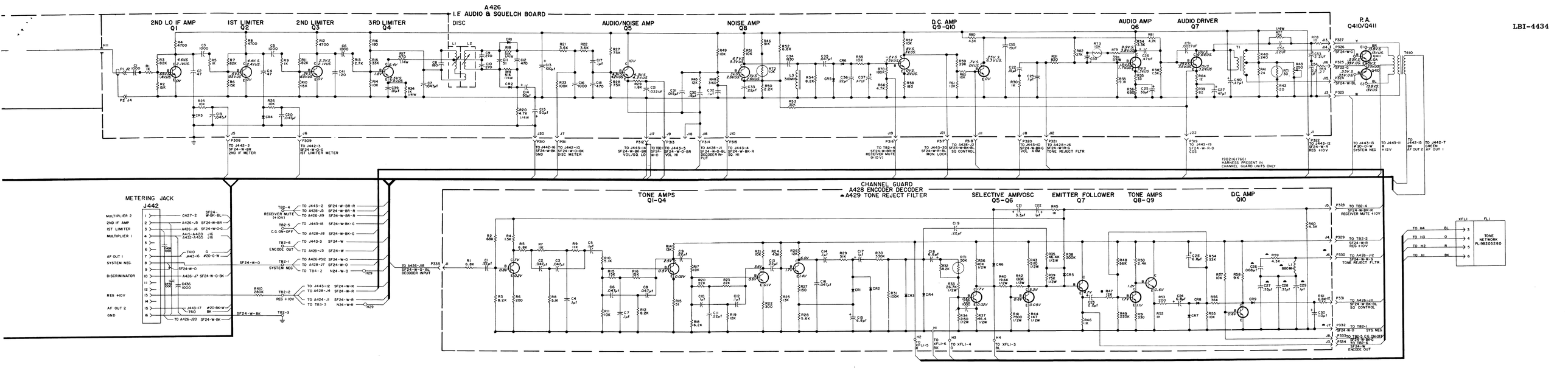
SYM NO	PARTS LIST	REV. LETTER
A432	PLI9C311764G1	
A433	PLI9C311764G2	
A434	PLI9C311764G3	
A435	PLI9C311764G4	

NOTE:
1. W41 AND W445 PRESENT ONLY IN UHF RECEIVERS. W41 PRESENT ONLY IN NON VHF RECEIVERS.

SCHEMATIC DIAGRAM

470—512 MHz RECEIVER
MODELS 4ER42K10-33 & 4ER42L10-33



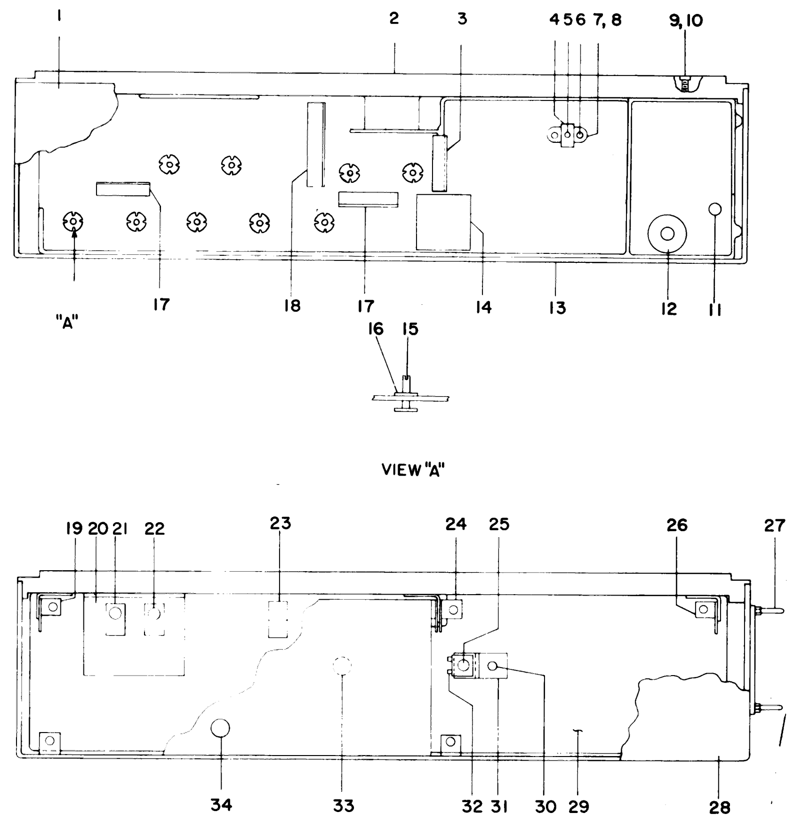


SCHEMATIC DIAGRAM

470—512 MHz RECEIVER
MODELS 4ER42K10-33 & 4ER42L10-33

Issue 1

SYMBOL	GE PART NO.	DESCRIPTION
R55	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R57	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R58	3R77P181K	Composition: 180 ohms ±10%, 1/2 w.
R59	3R77P393K	Composition: 39,000 ohms ±10%, 1/2 w.
R60 and R61	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R64	3R77P120J	Composition: 12 ohms ±5%, 1/2 w.
R66	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R70	3R77P184J	Composition: 0.18 megohm ±5%, 1/2 w.
R77	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R78	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.
R79	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R80	3R152P432J	Composition: 4300 ohms ±5%, 1/4 w.
R81	3R152P472J	Composition: 4700 ohms ±5%, 1/4 w.
R82	3R77P273J	Composition: 27,000 ohms ±5%, 1/2 w.
R84	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
		- - - - - - - - - - THERMISTORS - - - - - - - -
RT1	5490828P41	Thermistor: 30 ohms ±10%, color code black, white; sim to Globar Type B1211H-4.
RT2	5490828P9	Thermistor: 10,000 ohms ±10%, color code yellow; sim to Globar Type 551H-8.
RT3	5490828P9	Thermistor: 10,000 ohms ±10%, color code yellow; sim to Globar Type 551H-8.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T1	19A116040P1	Audio freq: 300 to 4000 Hz, Pri: 19.3 ohms ±10% DC res, Sec: 23.5 ohms ±10% DC res.
A428		ENCODER/DECODER 4EK16A10
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C2 and C3	19A116080P205	Polyester: 0.047 µf ±5%, 50 VDCW.
C4	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
C5	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C6	19A116080P205	Polyester: 0.047 µf ±5%, 50 VDCW.
C7	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
C8	19A116080P205	Polyester: 0.047 µf ±5%, 50 VDCW.
C9	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C10	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
C11	19A116080P109	Polyester: 0.22 µf ±10%, 50 VDCW.
C12	19A116080P207	Polyester: 0.1 µf ±5%, 50 VDCW.
C13	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C14	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C15	5496267P1	Tantalum: 6.8 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C16	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C17	5496267P417	Tantalum: 1.0 µf ±5%, 35 VDCW; sim to Sprague Type 150D.
C18	5496267P1	Tantalum: 6.8 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C19	19A116080P109	Polyester: 0.047 µf ±10%, 50 VDCW.
C20	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C21	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C22	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C23	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C24	5496267P1	Tantalum: 6.8 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C25	5496267P18	Tantalum: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C26	19A116080P206	Polyester: 0.068 µf ±5%, 50 VDCW.
C27 and C28	19A116080P210	Polyester: 0.33 µf ±5%, 50 VDCW.
C29	19A116080P205	Polyester: 0.047 µf ±5%, 50 VDCW.
C30	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115250P1	Silicon.
CR3 and CR4	5494922P1	Silicon.
CR5	19A115250P1	Silicon.
CR6	4036887P3	Silicon, Zener.
CR7 thru CR9	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J8	4033513P4	Contact, electrical sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - -
L1	19A115690P1	Coil, RF: 880 mh ±5%, sim to Artted AC5672.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q2	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q3 and Q4	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q5 thru Q8	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q9 and Q10	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1	3R152P682K	Composition: 6800 ohms ±10%, 1/4 w.
R2	3R152P683J	Composition: 68,000 ohms ±5%, 1/4 w.
R3	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R4	3R152P152J	Composition: 1500 ohms ±5%, 1/4 w.
R5	3R152P682K	Composition: 6800 ohms ±10%, 1/4 w.
R6	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R7	19A116278P305	Metal film: 11,000 ohms ±2%, 1/2 w.
R8	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R9	19A116278P305	Metal film: 11,000 ohms ±2%, 1/2 w.
R10	3R152P512J	Composition: 5100 ohms ±5%, 1/4 w.
R11	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R12	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R13	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R14	3R152P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R15	3R152P510J	Composition: 51 ohms ±5%, 1/4 w.
R16	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R17	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R18	3R152P622J	Composition: 6200 ohms ±5%, 1/4 w.
R19	3R152P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R20	3R152P223J	Composition: 22,000 ohms ±5%, 1/4 w.
R21	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R22	3R152P301J	Composition: 300 ohms ±5%, 1/4 w.
R23	3R152P223J	Composition: 22,000 ohms ±5%, 1/4 w.
R24	3R152P433J	Composition: 43,000 ohms ±5%, 1/4 w.
R25	3R152P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R26	3R152P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R27	3R152P151J	Composition: 150 ohms ±5%, 1/4 w.
R28	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R29	3R152P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R30	3R152P334J	Composition: 0.33 megohm ±5%, 1/4 w.
R31	3R152P104J	Composition: 0.1 megohm ±5%, 1/4 w.
R32	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R33	19A116278P342	Metal film: 26,700 ohms ±2%, 1/2 w.
R34	19A116278P233	Metal film: 2150 ohms ±2%, 1/2 w.
R35	19A116278P365	Metal film: 46,400 ohms ±2%, 1/2 w.
R36	19A116278P301	Metal film: 10,000 ohms ±2%, 1/2 w.
R37	19A116278P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R38	3R152P204J	Composition: 0.2 megohm ±5%, 1/4 w.
R39	19A116278P385	Metal film: 75,000 ohms ±2%, 1/2 w.
R40	19A116278P329	Metal film: 19,000 ohms ±2%, 1/2 w.
R41	19A116278P285	Metal film: 7500 ohms ±2%, 1/2 w.
R42	19A116278P412	Metal film: 130,000 ohms ±2%, 1/2 w.
R43	19A116278P269	Metal film: 5110 ohms ±2%, 1/2 w.
R44	19A116278P117	Metal film: 147 ohms ±2%, 1/2 w.
R45 and R46	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
		NOTE: The value of Resistor R47 must be obtained from the component, then find corresponding value in parts list for the correct part number.
R47A	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R47B	3R152P912J	Composition: 9100 ohms ±5%, 1/4 w.
R47C	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R47D	3R152P113J	Composition: 11,000 ohms ±5%, 1/4 w.
R47E	3R152P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R47F	3R152P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R47G	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R47H	3R152P752J	Composition: 7500 ohms ±5%, 1/4 w.
R48	3R152P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R49	3R152P224J	Composition: 0.22 megohms ±5%, 1/4 w.
R50	3R152P242J	Composition: 2400 ohms ±5%, 1/4 w.
R51	3R152P331J	Composition: 330 ohms ±5%, 1/4 w.
R52	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R53	3R152P201J	Composition: 200 ohms ±5%, 1/4 w.
R54	3R152P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R55	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R56	3R152P363J	Composition: 36,000 ohms ±5%, 1/4 w.
R57	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R58	3R152P913J	Composition: 91,000 ohms ±5%, 1/4 w.
R59	3R152P182J	Composition: 1800 ohms ±5%, 1/4 w.
R60	3R152P432J	Composition: 4300 ohms ±5%, 1/4 w.
R61	3R152P682K	Composition: 6800 ohms ±10%, 1/4 w.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	5490828P22	Thermistor: 50,000 ohms ±10%, color code yellow; sim to Globar Type 763H.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XFL1	19A121920G3	Reed, mica-filled phen: 7 pins rated at 1 amp at 500 VRMS with 4-1/2 inches of cable.
A429		TONE REJECT FILTER 19C311797G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C26	19A116080P206	Polyester: 0.068 µf ±5%, 50 VDCW.
C27 and C28	19A116080P210	Polyester: 0.33 µf ±5%, 50 VDCW.
C29	19A116080P205	Polyester: 0.047 µf ±5%, 50 VDCW.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J6 and J7	4033513P4	Contact, electrical; sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A115690P1	Coil, RF: 880 mh ±5%, sim to Artted AC5672.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R59	3R152P182J	Composition: 1800 ohms ±5%, 1/4 w.
A432 thru A435		OSCILLATOR/MULTIPLIER BOARD A432 19C317654G1, A433 19C317654G2, A434 19C317654G3, A435 19C317654G4
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 thru C3	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5491601P123	Phenolic: 1.5 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C5	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C6		(Part of T1).
C7		(Part of T2).
C8	5491601P131	Phenolic: 3.9 pf ±5%, 500 VDCW.
C9	5490008P135	Silver mica: 220 pf ±10%, 500 VDCW; sim to Electro Motive Type DM-15.
C10 thru C14	19A116655P20	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C15	5491601P128	Phenolic: 2.7 pf ±5%, 500 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR5	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J8	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L1 and L2	7488079P16	Choke, RF: 10 µh ±10%, 0.6 ohm DC res max; sim to Jeffers 4421-7K.
L5		(Part of T1 and T2).
L6	7488079P35	Choke, RF: 2.20 µh ±10%, 0.50 ohms DC res max; sim to Jeffers 4412-9K.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115991P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R2	3R152P151J	Composition: 150 ohms ±5%, 1/4 w.
R3	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R5 and R6	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R7	3R77P272K	Composition: 2700 ohms ±10%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 and T2		COIL ASSEMBLY T1 19B219145G1, T2 19B219145G2
		- - - - - - - - - - CAPACITORS - - - - - - - -
C6	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L5	19A121728P1	Coil.
	5491798P7	Tuning slug.
		ICOMS
		NOTE: When reordering specify ICOM Frequency. ICOM Freq = Operating Freq -12.4 MHz / 24
Y1 thru Y4	4EG26A10	Integrated Circuit Oscillator Module (ICOM).
	19D413070P1	Cap, decorative.
		- - - - - - - - - - SOCKETS - - - - - - - - -
XY1 thru XY4	19B216043G1	Socket, (ICOM).
		CHASSIS AND RF CIRCUIT 19E500928G1 thru G4
		- - - - - - - - - CAPACITORS - - - - - - - - -
C410 and C411		Refer to Mechanical Parts (RC-2422).
C412 and C413	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C414 thru C418		Refer to Mechanical Parts (RC-2422).
C419 thru C422	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C423 and C424		Refer to Mechanical Parts (RC-2422).
C425 thru C427	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C428	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C429	19A115680P4	Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C430 and C431	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C433	5493392P107	Ceramic, stand-off: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type SS5D.
C435 and C436	7774750P4	Ceramic disc: .001 µf +100% -0%, 500 VDCW.
C437	5493392P3	Ceramic, feed-thru: 47 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C438	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C439 and C440	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C441	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A116062P2	Selenium.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J441		(Part of W441).
J442	19B205689G2	Connector: 18 contacts rated at 5 amps min at 1000 VDC max.
J443	19C303426G1	Connector: 20 pin contacts.
J444		(Part of W444).
		- - - - - - - - - INDUCTORS - - - - - - - - -
L410	19B204938G23	Coil.
L411	19B204938G24	Coil.
L412	19B204938G29	Coil.
L413	19B204938G30	Coil.
L414	19B204938G25	Coil.
L415 thru L417	19B204936P12	Coil.
L418	19B204938G27	Coil.
L419	19B204938G31	Coil.
L420 thru L422	19B204936P10	Coil.
L423	19B204938G26	Coil.
L424	19B204938G28	Coil.
L425	19B204936P12	Coil.
L426	19B204938G32	Coil.
L427	19B204936P10	Coil.
L428 and L429	7488079P18	Choke, RF: 15 µh ±10%, 1.2 ohms DC res; sim to Jeffers 4421-9K.
L430 and L431	7488079P6	Choke, RF: 1.0 µh ±10%, 0.30 ohms DC res; sim to Jeffers 4411-8K.
L432	19A127433P1	Coil.
L433 and L434	19A115700P2	Bead, ferrite.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P305 thru P311	4029840P2	Contact, electrical: sim to Amp 42827-2.
P312	4029840P3	Contact, electrical: sim to Amp 42101-2.
P313	4029840P2	Contact, electrical: sim to Amp 42827-2.
P315 thru P317	4029840P2	Contact, electrical: sim to Amp 42827-2.
P319 and P320	4029840P2	Contact, electrical: sim to Amp 42827-2.
P322	4029840P2	Contact, electrical: sim to Amp 42827-2.
P323	4029840P1	Contact, electrical: sim to Amp 41854.
P324	4029840P2	Contact, electrical: sim to Amp 42827-2.
P325	4029840P1	Contact, electrical: sim to Amp 41854.
P326	4029840P2	Contact, electrical: sim to Amp 42827-2.
P327	4029840P1	Contact, electrical: sim to Amp 41854.
P410 and P411	4029840P1	Contact, electrical: sim to Amp 41854.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q410 and Q411	19A116741P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R410	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R411	3R78P390K	Composition: 39 ohms ±10%, 1 w.
		- - - - - - - - - TRANSFORMERS - - - - - - -
T410	19A116041P2	Audio freq: freq range 300 to 4000 Hz, Pri: 1.00 ohm ±15% DC res, Sec 1: 0.23 ohm ±10% DC res, Sec 2: 10.5 ohms ±15% DC res.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7487424P2	Miniature, phen: 1 terminal.
TB2	7487424P26	Miniature, phen: 6 terminals.
TB3 and TB4	7487424P24	Miniature, phen: 3 terminals.
		- - - - - - - - - - CABLES - - - - - - - - -
W441	19B205634G3	Coaxial cable: 50 ohm, approx 5 inches long. Includes (J441) 19B209122P3 connector.
W444	19B205634G7	Coaxial cable: 50 ohm, approx 7 inches long. Includes (J444) 19B209122P4 connector.
W445	19A122550G1	RF: 50 ohm imp, approx 4 inches long.
		MULTI-FREQUENCY MODIFICATION KIT 19A127096G1 and G2
	19A127136G1	Harness assembly.
P301 thru P304	4029840P2	Contact, electrical; sim to Amp 42827-2. (Part of 19A127136G1 Harness assembly).
L435 thru L442	19A115700P2	Bead, ferrite. (Part of 19A127136G1 Harness assembly).
L443 thru L450	19A115700P2	Bead, ferrite.
		MECHANICAL PARTS (SEE RC-2422)
1	19C303495G4	Bottom cover. (Station)
	19C303385G1	Bottom cover. (Mobile)
2	19C317344P3	Heat sink.
3	19A121723P1	Support. (Mounts C425 and C426)
4	4033089P1	Clip. (Part of XY1-XY4).
5	19B200525P9	Rivet. (Part of XY1-XY4).
6	19A115793P1	Contact. (Part of XY1-XY4).
7	4039307P1	Crystal socket. (Part of XY1-XY4).
8	19A122008P1	Insulator. (Part of XY1-XY4).
9	4029387P4	Nut, sheet spring.
10	19A115332P3	Tap screw: No. 6-32 x 5/16.
11	4035306P59	Fiber washer. (Used with Y2).
12	4034252P5	Can. (Used with T1).
13	19C303389G1	Chassis.
14	19A121722P1	Plate.
15	4036765G5	Screw. (Part of C410, C411, C414-C418, C423 and C424).
16	7137968P8	Nut, stamped: thd size No. 6-32; sim to Palnut T0632005. (Part of C410, C411, C414-C418, C423 and C424).
17	19A121724P1	Support. (Mounts C419 and C420).
18	19A127372P1	Support. (Mounts C427, C430 and C431).
19	19B204583G3	Hinge.
20	19B216727P1	Support. (Used with Q410 and Q411).
21	19A116023P2	Plate, insulated. (Used with Q410 and Q411).
22	19A116022P1	Insulator. (Used with Q410 and Q411).
23	4029851P6	Clip, loop.
24	19B204583G1	Hinge.
25	N115P1508C13	Screw, flathead, self tap: No. 8 x 30.
26	19B204583G2	Hinge.
27	19A121676P1	Guide pin.
28	19C303495G3	Top cover. (Station, except Repeaters and VM).
	19C303676G2	Top cover. (Station, Repeater and VM only).
	19C303385G2	Top cover. (Mobile).
29	19A129106G1	Plate. (Located over RF Circuit).
30	19B201074P205	Tap screw, Phillips Pozidriv: 4-40 x 5/16.
31	19A121297P2	Angle.
32	7160861P4	Nut, sheet spring. (Used to secure cover).
33	4036555P1	Insulator, disc. (Used with Q7 on A426).
34	4035267P2	Button, plug. (On A426).



RC-2422

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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